

Perceived Satisfaction and Perceived Usefulness of E-Learning: The Role of Interactive Learning and Social Influence

Ares Albirru Amsal^{1,*} Siska Lusia Putri² Febri Rahadi² Mellyna Eka Yan Fitri²

¹Department of Management Faculty of Economics Universitas Andalas, Padang West Sumatra Indonesia

²Department of Management Faculty of Economics and Business Universitas Dharma Andalas, Padang West Sumatra Indonesia

*Corresponding author. Email: aresalbirruamsal@eb.unand.ac.id

ABSTRACT

Understanding the factors that influence the satisfaction of e-learning is critical. Therefore, this study aims to investigate the relationship between interactive learning, social influence, and perceived usefulness on perceived satisfaction with e-learning. Seventy-three students taking online learning were surveyed using a questionnaire. The results of the structural equation modelling analysis show that interactive learning and perceived usefulness have a significant effect on e-learning perceived satisfaction. However, when social influence affects perceived usefulness significantly, the effect of interactive learning on perceived usefulness is insignificant. This research is useful for academics, teachers, lecturers, and university ICT to put the concern to student satisfaction factors in online learning.

Keywords: *Interactive learning, Social influence, Perceived usefulness, E-learning, Perceived satisfaction*

1. INTRODUCTION

E-learning is a form of the latest development of distance learning, where instructors and students can be at different places and times in the teaching and learning process [1]. E-learning uses information communication technology to convey information or teaching material without geographical barriers and time constraints. The learning paradigm of e-learning is a new approach and continually developing world of education [2]. This online learning approach expands the interaction between instructors and students, removing space and time boundaries through asynchronous and synchronous devices [3].

Bouhnik and Marcus [4] stated that e-learning has four benefits: freedom in determining the lessons to be studied, minimal dependence on lecturers, freedom to express opinions, thoughts, equate questions without obstacles, and the ease of obtaining learning material according to student interests. With the benefits that e-learning offers and the development of the internet, e-learning systems are now widely used in universities [5].

However, despite the many benefits that e-learning systems offer and the massive development of users in recent years, research shows that not all students use it until the end of courses [6]. It indicates that there is something that affects the use of the e-learning system. Other factors need to be explored so that improvements can be made to online learning. Previous research by Bouhnik and Marcus [4] revealed the factors causing dissatisfaction with e-learning, namely: lack of institutional support that encourages students to learn, the need for high self-discipline, there is no learning atmosphere in the system, distance learning systems reduce contact, discussion, between students and instructors, and a less efficient learning process. Other factors identified in previous studies are the clarity of design, interaction with instructors, and active discussion [7]. These factors can increase student satisfaction with e-learning.

Understanding student attitudes towards e-learning is an essential issue for the world of education today. Therefore, this study tries to explore other factors that influence student satisfaction. In this study, we choose Moodle as an e-learning platform.

1.1. Effective e-learning

E-learning refers to any electronic device intended for learning, including sharing electronic content via computer networks, audio, broadcast, interactive tv, and others [2]. As learning activities have become more individualized, student-centered e-learning technology has become more personalized, user-centered, networked, and durable [8]. The character of e-learning fulfills students' needs in the digital era and has attracted educational and business institutions to develop it [3].

To improve e-learning users' experiences, Liaw and Huang [9] suggested four elements that need to be considered for building a learning environment: useful environmental characteristics, enhancing environmental satisfaction, practical learning activities, and positive learners' characteristics.

1.2. Interactive learning

An interactive learning environment involves communication and exploration of activities [10]. Communication activities include email, chat forums, online conferencing, and blogs, which are suitable for asynchronous and synchronous social communication. On the other hand, exploration activities include surfing the internet to find lecture content. Therefore, the e-learning environment offers interaction types such as learning content interaction, student-to-student communication, and student-instructor communication.

In the e-learning system, students carry out social and interpersonal interactions via a computer or smartphone, not through face-to-face communication. In some aspects, e-learning offers excellent potential for social and interpersonal communication that face-to-face communication does not have. Communication such as asking, answering, discussing, debating, and negotiating can be done online between students and lecturers and among the e-learning system [11].

Asynchronous communication is communication using technology that is independent of instructors or other users. In asynchronous communication, students work with themselves and have control over their learning phase. Synchronous communication is carried out in real-time, where it takes the presence of instructors and other users simultaneously. Based on previous research, interactive learning positively affects user satisfaction [10], [12]. Moreover, interactive learning also affects the perceived usefulness of the e-learning system [13].

1.3. Social Influence

Thompson *et al.* explained that Social influence represents the environmental influence in shaping

behavior [14]. In online learning, the social environment includes colleagues and instructors. If these individuals encourage the use of e-learning systems, students will be more interested in using it [15]. Social interaction is also included in environmental factors that are outside the student. The model developed by Liaw [13] explained that environmental factors affect perceived usefulness.

1.4. Perceived usefulness

In most cases, the usefulness of a system affects learning effectiveness [16]. Usability is a quality that reflects the ease of use in human and computer interactions [17]. The international standard ISO 9241 defines it as the ease of a product in meeting user objectives effectively, efficiently, and satisfactorily. Liaw [13] explained that perceived usefulness affects perceived satisfaction.

1.5. Perceived satisfaction

Perceived satisfaction is the user's acceptance of a system and the level of comfort in its use. It can also be interpreted as the pleasure that a person feels when he takes action and then gets the result [2]. The concept of satisfaction is the aggregate of a person's feelings on several factors that affect a particular situation. Doll and Torkzadeh [18] defined satisfaction as a condition of how users feel about a given system. The high level of user satisfaction will affect the level of willingness to use the system in the future.

1.6. Research hypothesis

Based on the literature review, the researcher offers the following research hypothesis:

H1: Interactive learning will positively affect perceived satisfaction

H2: Interactive learning will positively affect perceived usefulness

H3: Social influence will positively affect perceived usefulness

H4: Perceived usefulness will positively affect perceived satisfaction

The research hypothesis is illustrated in the research framework in Figure 1.

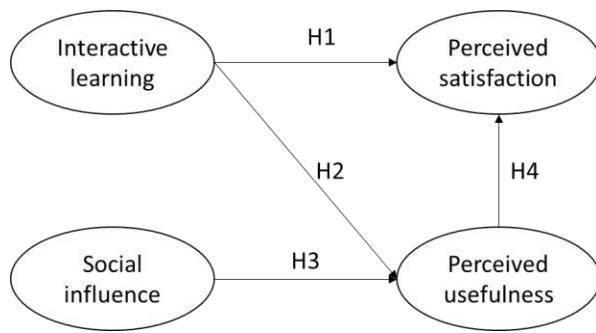


Figure 1 Research framework and hypotheses

2. METHODS

2.1. Participant

The research subjects were users of the Modular Object-Oriented Dynamic Learning Environment (Moodle). Moodle is a web-based platform explicitly created as a learning management system. It is an option to make teaching and learning activities more effective. So, all teaching and learning activities are carried out by accessing the website using a browser. This system has main features: distributing a subject matter, collecting assignments, quizzes, attendance, and monitoring learning activities' progress.

Questionnaires were distributed online to participants by collecting basic demographics data and questions regarding their e-learning experience. Of the 91 questionnaires collected, 18 were excluded because of invalid responses, leaving 73 valid answers.

2.2. Measurements

The questionnaire was adapted from research by Liaw [13], Liaw and Huang [10], and Prasad *et al.* [15]. The research questions were then adapted to suit the conditions of students in the city of Padang. The questionnaire consists of two parts: the demographic section and the questioning section related to research variables. Demographic information includes age, gender, average monthly expenditure, data access to the internet, electronic communication devices used, length of time spent surfing the internet in a day, length of time using computers (computer skills/literacy), and previous online learning experiences. Questions related to variables include "interactive learning," "social influence," "perceived usefulness," and "perceived satisfaction." Items related to these four variables are measured using a 5-Likert scale where the number 1 reflects strongly disagree, and number 5 reflects strongly agree. Questions are submitted in Indonesian after peer review of the translation results. Variables, number of questions, and reference sources are shown in Table 1.

Table 1. Variables, questions quantity, dan references

Constructs	Q	Reference
Interactive Learning (ILE)	4	Liaw [13], Liaw and Huang [10]
Perceived Usefulness (PU)	3	
Perceived Satisfaction (PS)	3	
Social Influence (SI)	3	Prasad <i>et al.</i> [15]
Total	16	

3. RESULTS AND DISCUSSION

3.1. Demographics

More than half of the participants (78%) were female. The average age is 21.7 years, which indicates the average age of students in semester 7 or 8. The majority of respondents' monthly expenses are Rp. 500,000 - 1,000,000 (64%). Almost all of them use personal data to access the internet, and less than a fifth (18%) of respondents use home WiFi.

Regarding the devices used, 96% of respondents use smartphones, followed by 34% of laptops. The time spent on the internet is relatively evenly distributed, between 1 to more than 6 hours per day (18%-30%), but only three respondents spent less than 1 hour. Forty-seven respondents (64%) have never used online learning, and another quarter has ever used e-learning.

Table 2. Demographics of participant

Profiles	Item	Q	%
Sex	Male	16	22%
	Female	57	78%
Age	Average: 21,7 y.o		
Average expenditure per month (IDR)	Less than 500.000	8	11%
	500.000 – 1.000.000	47	64%
	1.000.000 – 1.500.000	13	18%
	1.500.000 – 2.000.000	1	1%
	2.000.000 - 3.000.000	0	0%
	More than 3.000.000	4	5%
Internet connection	Home Wifi	13	18%
	Café Wifi	4	5%
	Campus Wifi	8	11%
	Personal internet data	66	90%
Device	Laptop	25	34%
	Tablet	1	1%
	Smartphone	70	96%
Length internet-related activities (hour)	less than 1 hour	3	4%
	1-2 hours	19	26%
	3-4 hours	16	22%
	5-6 hours	13	18%
	More than 6 hours	22	30%
E-learning experience	Never	47	64%
	Rarely	6	8%
	Once in a while	18	25%
	Often	2	3%

3.2. The Goodness of fit outer model

To test the goodness of fit outer model, researchers used the loading factor indicator, cross-loading, composite reliability, and average variance extracted (AVE). Of the 16 indicators tested, the SI1 indicator was deleted because it had an outer loading of less than 0.7 (0.591). After that, the researchers again tested

these indicators with the results presented in Table 3 and Table 4.

Table 3. Loading factor, cross loading

Indicators	Loading factor > 0.7	Crossloading > other indicators value
ILE1	0.720	Yes
ILE2	0.875	Yes
ILE3	0.926	Yes
ILE4	0.824	Yes
PS1	0.930	Yes
PS2	0.941	Yes
PS3	0.938	Yes
PU1	0.871	Yes
PU2	0.868	Yes
PU3	0.910	Yes
SI2	0.918	Yes
SI3	0.919	Yes

Table 4. Composite Reability and Average Variance Extracted (AVE)

Variables	Composite reability	AVE>0.5
Interactive learning	0.905	0.705
Perceived satisfaction	0.955	0.877
Perceived usefulness	0.914	0.780
Social Influence	0.915	0.843

Based on the outer model indicators presented, all loading factors, cross-loading, composite reliability, and AVE have met the specified standards.

3.2. Goodness of fit inner model

The inner model Goodness of Fit (GoF) test is performed to see the suitability of the relationship between variables. Several parameters were used in the GoF test, namely R square, f square, and Q square (Table 5).

Table 5. R square, f square, dan Q square

R square		
Variables	R Square	R Square Adjusted
Perceived satisfaction	0.682	0.673
Perceived usefulness	0.548	0.535
F square		

Variables	ILE	PS	PU	SI
Interactive learning (ILE)		0.526	0.108	
Perceived satisfaction (PS)				
Perceived usefulness (PU)		0.302		
Social Influence (SI)			0.363	
Q square				
Variables	Q ² (=1-SSE/SSO)			
Interactive learning (ILE)				
Perceived satisfaction (PS)	0.532			
Perceived usefulness (PU)	0.393			
Social Influence (SI)				

The Adjusted R square measures how far the model can explain endogenous variation. Based on data processing, the adjusted R square for variable perceived satisfaction is 0.673, which is considered substantial. Meanwhile, for the variable perceived usefulness, the R square has a value of 0.535, which is moderate, approaching substantial. The size of F square shows the estimated path relationships in the structural model. The F square of interactive learning value toward perceived satisfaction, social influence towards perceived usefulness, and perceived usefulness towards perceived satisfaction is categorized as a strong influence with values of 0.526, 0.363, 0.302, respectively. Meanwhile, the value of F square interactive learning for perceived usefulness is 0.108, which is moderate. The value of Q square > 0 indicates evidence that the observed values have been appropriately reconstructed so that the model has predictive relevance. The Q square value of perceived

satisfaction and perceived usefulness (0.532 and 0.393) shows a value greater than 0, which means that the variable has predictive relevance.

3.3. Structural Equation Modeling

To test the relationship between variables, researchers used partial least squares structural equation modeling (PLS-SEM). PLS-SEM is useful for analyzing the relationship between small sample size variables and a complex model and does not require database assumptions [19]. The indicators used to examine the relationship between variables are t-statistic (Figure 4), p-value, and original sample (o). The results of the three statistical values can be seen in Table 6.

Table 6. t-statistic, p-value, dan original sample

Variables	Original Sample (o)	T Statistics	P Values
Interactive learning -> Perceived satisfaction (H1)	0.521	3.567	0.000
Interactive learning -> Perceived usefulness (H2)	0.286	1.924	0.055
Social Influence -> Perceived usefulness (H3)	0.525	4.320	0.000
Perceived usefulness -> Perceived satisfaction (H4)	0.395	3.638	0.000

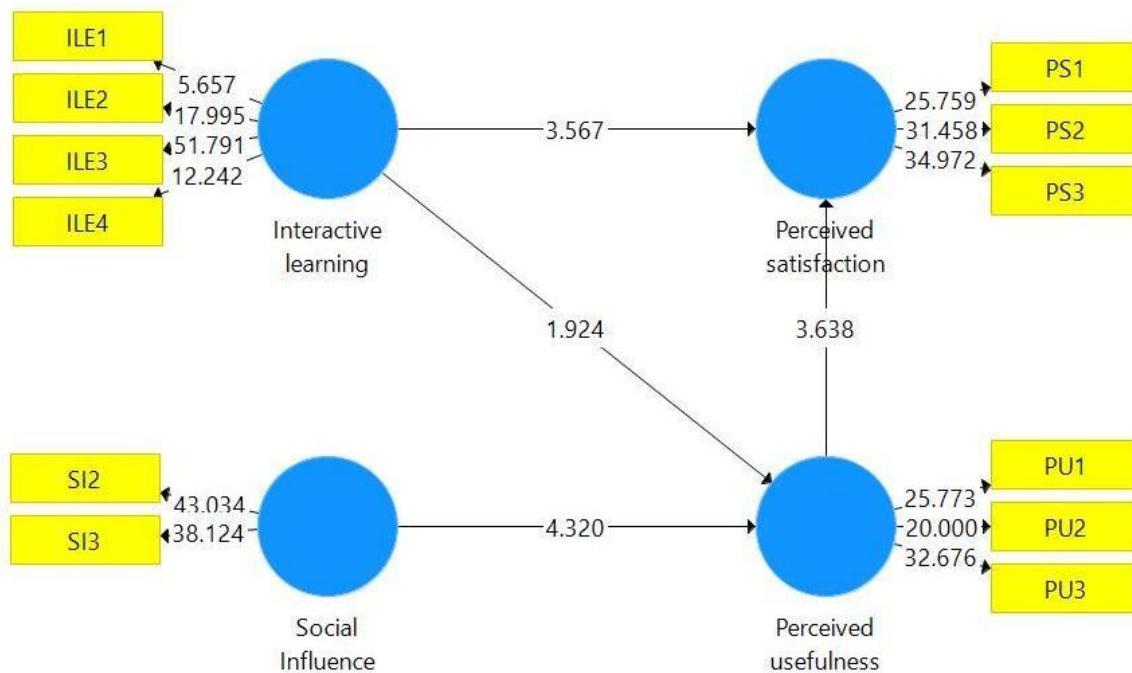


Figure 2 t-statistic values

Based on the SEM test, three of the four proposed hypotheses are accepted (H1, H3, H4), and only H4 is rejected.

Interactive learning has a significant positive relationship with perceived satisfaction ($\gamma = 0.521$, $t = 3.567$); therefore H1 is accepted. These results are consistent Liaw & Huang, and Sharma *et al.*, with [9], [12] and Liaw and Huang [10]. These findings confirm that the implementation of interactive e-learning can increase the satisfaction of e-learning users.

Statistical data on interactive learning for perceived usefulness was insignificant ($\gamma = 0.286$, $t = 1.924$). Therefore, H2 is rejected. This result contradicts the findings of Liaw [13]. This difference in results could be due to differences in the e-learning platforms used by respondents. This study uses the Moodle platform, where the system provides standard features with less user change options.

Furthermore, social influence has a significant positive effect on perceived usefulness ($\gamma = 0.525$, $t = 4.320$); therefore, H3 is accepted. These results support the research model developed by Liaw [13]. They indicate that creating a positive environment for e-learning students is very important to increase user satisfaction with e-learning.

Finally, the variable perceived usefulness has a significant positive effect on perceived satisfaction ($\gamma = 0.395$, $t = 3.638$), which means that H4 is accepted.

These results align with the model compiled by Liaw [13]. The higher the benefits felt by users, the higher the satisfaction with e-learning.

4. CONCLUSION

Based on the results of this study, several conclusions can be drawn and their implications for instructors who conduct online learning and those in charge of information technology. First, interactive learning needs to be developed in online learning because it affects student satisfaction. The implementation of interactive learning can be applied as creating interesting modules, quizzes in the form of games, and tutor activeness in building a classroom atmosphere. Second, peer influence needs to be controlled. The positive peer influence will increase the sense of usefulness towards e-learning, and vice versa. Building a mutually supportive environment in the e-learning process can be formed by providing counseling at the beginning of lectures. Finally, the benefits of e-learning need to be addressed because it also affects satisfaction. The benefits of e-learning compared to face-to-face learning, such as freedom in determining the lessons to be studied and being more independent, must be felt by students.

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